

Before the
FEDERAL COMMUNICATIONS COMMISSION
 Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
 OFFICE OF THE SECRETARY

 In the Matter of)

Amendment of Part 90 of the)
 Commission's Rules to Adopt)
 Regulations for Automatic)
 Vehicle Monitoring Systems)
 _____)

PR Docket No. 93-61

RM-8013

REPLY COMMENTS OF HUGHES TRANSPORTATION MANAGEMENT SYSTEMS

Hughes Transportation Management Systems ("Hughes"), a wholly-owned subsidiary of Hughes Aircraft Company, hereby submits supplemental reply comments in the above-captioned proceeding, in accordance with the Commission's notices dated February 9, February 25 and March 18, 1994, and in accordance with the Commission's Notice of Proposed Rulemaking, 8 FCC Rcd. 2502 (April 9, 1993) (the "NPRM"), regarding proposed rules for Automatic Vehicle Monitoring ("AVM") systems. These reply comments address submissions in this proceeding discussing proposals in ex parte presentations of PacTel Teletrac ("PacTel") and Southwestern Bell Mobile Systems, Inc. ("SBMS"). Hughes originally filed comments regarding the NPRM on June 29, 1993, reply comments on July 29, 1993, and comments regarding the PacTel and SBMS proposals on February 25, 1994 (the "Hughes Comments").

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PacTel and SBMS are both wide-area AVM service providers,^{1/} and most of the comments submitted in response to their proposals relate to spectrum needs of wide-area systems and compatibility of such systems with other users of 902-928 MHz, such as unlicensed equipment operating under Part 15 of the Commission's rules. Hughes has designed and currently manufactures a local-area AVM system that supports a wide variety of Intelligent Vehicle Highway System objectives in areas of commercial vehicle management, public safety and traffic control. Accordingly, Hughes confines these reply comments to matters affecting local-area licensing and operations.

DISCUSSION

I. CHANNEL PLANS

Consistent with its position throughout this rulemaking proceeding, Hughes supports the Commission's proposed channel plan for AVM, which would allocate 904-912 and 918-926 MHz for wide-area systems, and 902-904, 912-918 and 926-928 MHz for local-area systems. See NPRM at 2505, Hughes Comments at 5. A number of alternative plans have been proposed by various parties to this proceeding, including PacTel and SBMS. Whatever regime is eventually adopted for AVM, it must include two elements essential to a robust and evolving local-area AVM industry: (1) at least 6 MHz of contiguous spectrum

^{1/} As reiterated in the Hughes Comments, Hughes recommends that AVM systems be differentiated on the basis of function and coverage area, rather than by bandwidth, as proposed in the NPRM. Thus, under Hughes' proposal, systems that provide vehicle location services over large geographic areas, like those of PacTel and SBMS, would be designated "wide-area" AVM systems, while those providing vehicle-to-roadside communications services, at ranges typically less than one hundred meters, would be designated "local-area" AVM systems.

dedicated to local-area system use, and (2) channel separation between local- and wide-area systems.

If the Commission authorizes less than 6 megahertz for local-area services, by adopting the SBMS proposal, for example, and reducing the largest band of contiguous spectrum available to local-area systems to 3.5 megahertz, full development of local-area services that include high-speed data transfer in multi-lane environments would be threatened. A number of local-area AVM manufacturers and users have identified the same requirement for at least 6 MHz for effective operations, including Mark IV IVHS Division, the InterAgency Group, Amtech and AT&T. For this reason alone, SBMS' unsupported proposal to shift frequency bands proposed for wide-area use toward the center of the 902-928 MHz band is unacceptable, and must be rejected by the Commission. See SBMS Proposal, letter dated February 7, 1994, attachment.

As the Commission has recognized, NPRM at 2504, operation of local- and wide-area systems in the same frequency band is likely to lead to unacceptable interference. Nothing filed in this proceeding has demonstrated otherwise, and the Commission's proposed allocation of spectrum exclusively for local-area use, at 912-918 MHz, is of fundamental importance to local-area AVM technologies that are under development and that are already being deployed in projects such as Advantage I75.

Because of the high likelihood for interference between overlapping, co-channel systems, Hughes disagrees with Pinpoint Communications, Inc.'s ("Pinpoint") position that, as a general matter, local- and wide-area systems can operate on the same

frequencies. See Comments of Pinpoint at 29 (March 15, 1994).^{2/} Pinpoint apparently bases its recommendation for such a sharing arrangement on results of a compatibility test conducted in conjunction with Amtech in 1993. See Pinpoint ex parte notice of January 24, 1994, attachment, Hatfield Associates, Inc., Review and Discussion of the Pinpoint ARRAY™ Network and Its Performance ("Hatfield Report") at 6-1.

Hatfield Associates, Inc. concluded that "[t]he compatibility tests show that the Pinpoint network can also coexist with local systems operating in the same band without causing or receiving unacceptable levels of interference." Hatfield Report at 7-1. This conclusion is remarkable, in view of the test finding that "when the Pinpoint vehicle was within fifty to about one hundred feet of the Amtech [local-area] reader, it did not receive signals from the [wide-area] base station and hence would not respond to polls." Id. at 6-1.^{3/}

The Hatfield Report further states that, even when the wide-area transponder was transmitting from a distance of between five hundred feet and one half mile from the local-area tag reader, the local-area system detected the presence of the wide-area signal. Id. It is important to bear in mind that local-area systems are designed to operate at very short

^{2/} Hughes recognizes that it may be possible to coordinate co-channel use by local- and wide-area users on a case-by-case basis. However, because the geographic area for which a wide-area operator will be licensed is likely to include a large number of local-area systems, such coordination on local-area frequencies would become impossible, and should only be accomplished where, because of local-area system short-spacing, a local-area operator is forced to move into wide-area channels.

^{3/} Mobilevision, L.P., in its analysis of the Hatfield Report, concluded that wide-area operations would lead to unacceptable interference in local-area channels, reporting that "in the vicinity of a local area system a Pinpoint mobile loses its command channel, even when the [wide-area] bases station is only two miles away." Comments of Mobilevision, L.P. at Annex 5, Section 1.4.2.

ranges, usually less than 100 meters, and in circumstances that will involve large numbers of vehicle-to-roadside transactions in a short timespan. Even the occasional presence of detectible co-channel signals emanating from wide-area tags moving through local-area surveillance areas is likely to disrupt local-area operations.

Also of concern is the likelihood of interference from wide-area base stations transmitting into local-area reader coverage zones. Pinpoint has previously proposed high power limits for wide-area systems, which would make harmful interference into local-area systems even more likely. See Hughes Reply Comments at 12 (July 29, 1993) (discussing Pinpoint and Amtech proposals for wide-area power levels). For base stations, Pinpoint has proposed a 5 kilowatt ERP limit, with no limitation on antenna height.^{4/} In the compatibility tests conducted by Pinpoint and Amtech, and reported by Hatfield Associates, the wide-area base station radiated about 500 watts ERP, or one-tenth the upper limit proposed for operational wide-area stations. See Hatfield Report at 6-1. Relatively high power transmissions from wide-area base stations may overpower nearby local-area facilities operating in the same band.

Further, while time-division sharing methods for co-channel wide-area services have been proposed, See Pinpoint Comments at 28, PacTel Comments at 5-6, the sheer number of potential local-area systems to be installed within the coverage area of each wide-area system makes use of such techniques in resolving wide-area/local-area sharing virtually impossible. See Pinpoint Comments at 29 ("It is not contemplated that sharing between local- and wide-area systems would be on a time shared basis"). No party has adequately

^{4/} For mobiles, the proposed ERP limit is 50 watts.

demonstrated that, as a general matter, local- and wide-area systems can operate successfully in the same band, nor has any party proposed any method to overcome co-channel interference between such systems. Local-area AVM systems should be licensed exclusively in the 912-918 MHz band, as the Commission has proposed.

Several other AVM channel plans have been proposed by commenters in this proceeding. For example, PacTel has proposed that wide-area systems operate exclusively at 902-912 MHz, with local-area systems assigned in the remaining 16 MHz.^{5/} As previously stated in the Hughes Comments, at 5, because PacTel accommodates exclusive local-area licensing at 912-918 MHz, Hughes supports the PacTel proposal, insofar as it does not unnecessarily delay adoption of final AVM rules. In its most recent comments, however, PacTel asserts that its new proposal will increase from 10 MHz to 16 MHz the spectrum available "for co-primary narrowband/wideband use." PacTel Comments at 14 (March 15, 1994) (emphasis added). Hughes has not found other references to a proposal by PacTel that the local-area bands be shared on a co-primary basis with wide-area services. Co-primary status at 912-918 MHz would be unacceptable because of the likelihood of mutual interference between local- and wide-area systems, discussed above. The first wide-area

^{5/} As noted in the Hughes Comments, PacTel's proposal also provides for two forward link narrow band channels to remain at 924.89-925.39 MHz. If the PacTel proposal were adopted, the presence of these channels would reduce the amount of available spectrum for local-area use by roughly 4 MHz. Therefore, the narrow band paging channels should be moved to 902.0-902.5 MHz. See Comments of MFS Network Technologies, Inc. and Texas Instruments at 3-4 (PacTel's proposal would "waste" spectrum above 925.39 MHz by making it unusable for most AVM systems). An alternative that would also reduce the amount of spectrum lost to wideband use is to assign wide-area paging channels at 927.5-928.0 MHz, as proposed by Amtech at page 10 of its comments.

vehicle location system in a particular area to begin operations on a local-area channel could preclude later-arriving local-area providers from obtaining licenses.

Additionally, Mark IV IVHS Division advocates the earlier proposal by the Interagency Group to license local-area systems exclusively at 912-918 MHz, and to license them on a co-primary basis with wide-area systems in the 904-912 MHz and 918-926 MHz bands. Hughes also supports this proposal, again because it offers exclusive local-area licensing at 912-918 MHz, and provides needed flexibility to deal with rare instances of overlap between local-area systems. Also, Mobilevision, L.P. proposes licensing wide-area systems in the 902-910 and 920-928 MHz bands, with 910-920 MHz set aside exclusively for local-area system use (along with most Part 15 devices). Once again, because this proposal provides at least 6 MHz of contiguous bandwidth at the center of the 902-928 MHz band, Hughes does not oppose it.

AMTECH Corporation has proposed sharing of the entire 902-928 MHz band by local- and wide-area licensees, with provision for 4 MHz-wide "quiet zones" in which local-area operators would be forced to reduce power in order to accommodate wide-area systems. AMTECH Corporation Comments at 3-6 and note 11 (citing Hatfield Report). Like the Pinpoint proposal discussed above, the AMTECH frequency plan does not provide for exclusive allocation of spectrum for local-area systems at 912-918 MHz, nor does it adequately address questions regarding likelihood of co-channel interference between wide- and local-area AVM systems. However, AMTECH's proposed modifications to the PacTel proposal, providing for exclusive licensing for local-area systems above 912 MHz and attenuation of local-area signals at 910-912 MHz, is acceptable, as it would not require spectrum sharing between local- and wide-area systems in the 912-918 MHz band.

II. PART 15 COMPATIBILITY

While a number of manufacturers and users of devices operating under Part 15 of the Commission's rules have asserted that such devices will suffer interference from co-channel operations with wide-area AVM systems in the 902-928 MHz band, [cites] only one Part 15 operator has made a similar claim in this round of comments regarding local-area, or narrow-band, systems and Part 15 devices. See Comments of Itron, Inc. ("Itron") at 4 (March 15, 1994).^{6/} Itron states that narrowband AVM systems and Part 15 devices are incompatible because of the high AVM power levels proposed by the Commission in the NPRM. Id.

In recognition of the unnecessary potential for interference between local-area systems and with other users of the 912-918 MHz band, Hughes proposed that local-area systems be subject to a power limit of 30 watts ERP at an antenna height of no more than 15 meters. Hughes stands by this proposal, noting once again that local-area AVM systems operate at very short ranges, making height/power greater than that proposed unnecessary. Moreover, Itron's concerns relate to automatic meter reading devices, which are not likely to be installed within the limited surveillance areas of local-area roadside tag readers, provided that appropriate power/height limits are adopted for such systems, thus limiting local-area coverage to the adjacent highway segment.

^{6/} In an ex parte notice filed in this proceeding last year, Norand Corporation alluded to interference risks between Part 15 spread spectrum operations and "narrowband systems." See letter of Norand Corporation dated December 16, 1993, attachment at 10. However, the record contains only Norand's discussion materials presented at a meeting with Commission staff, which include only bullet-style assertions regarding mutual interference. Norand presents no data supporting its position.

III. VOICE TRANSMISSIONS

Mobilevision urges the Commission to adopt rules that provide sufficient spectrum to wide-area operators to include "ancillary voice and data transmission capability" between base and mobile facilities. Mobilevision comments at 15. Hughes acknowledges that wide-area operations may encompass emergency and traffic routing functions that require communications beyond the pulse and return signals used for vehicle location and identification. Such a capability must, however, remain truly "ancillary" to the principal purposes of vehicle location and tracking.

As the Commission has proposed, "[AVM] systems may also transmit and receive status and instructional messages related to the units involved." NPRM at 2503 (emphasis added). The Commission has further explained that this wording was intended to avoid AVM systems being used for communications not "related to objects being monitored or located." Id. at n. 19. There is little practical need to set aside precious AVM spectrum for a general communications capability in conjunction with wide-area location equipment, because a number of other means of mobile voice communications already exist, and the field is growing rapidly. Moreover, creation of what would effectively be a new mobile communications service would in all likelihood create new issues and delay adoption of final AVM rules even further.

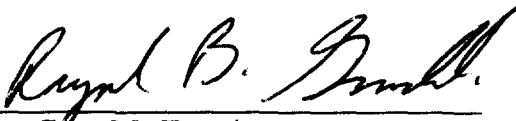
CONCLUSION

The Commission should adopt permanent rules for AVM as quickly as practicable, while ensuring that any channel plan it adopts preserves, at least, an exclusive allocation for local-area AVM technologies at 912-918 MHz. Also, the rules should include

height/power limits for local-area systems, in order to minimize the possibility of interference with other authorized users of the band. In the interest of reaching a conclusion to this proceeding and of providing as much spectrum as possible for actual AVM services, the final AVM rules should not set aside significant amounts of that spectrum for wide-area ancillary voice or data services.

Respectfully submitted,

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